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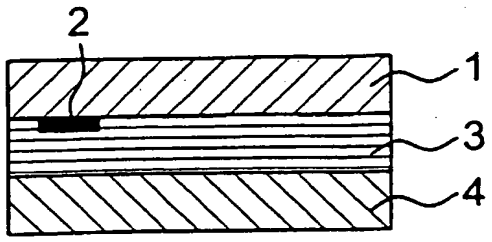
(54) Title: AN IDENTIFICATION OR CONTROL LABEL, AND A METHOD FOR ATTACHING IT TO TEXTILE OR LEATHER MATERIAL

(57) Abstract: An identification or control label to be attached to a textile or leather material (6) comprises a smart or alarm label (1), an adhesive layer (3) and a back film (4) arranged to be released before the attachment to the textile or leather material. The adhesive layer (3) of the identification or control label is cured by radiation. The present invention also relates to a method for attaching an identification or control label.



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An identification or control label, and a method for attaching it to textile or leather material

The present invention relates to an identification or control label to be attached to a textile or leather material, and a method for attaching an identification or control label to a textile or leather material.

In the present application, an identification label refers to a label comprising an identification (RFID) circuit. In the present application, a control label refers to a label comprising an electronic article surveillance (RF-EAS) circuit. The term smart label is used to refer to that part of an identification label which comprises an RFID circuit on the surface of a carrier material. The term alarm label is used to refer to that part of a control label which comprises an RF-EAS circuit on the surface of a carrier material. The surfaces of smart and alarm labels may be coated with a protective film, or they can be without a protective film.

In this application, textile material refers to all materials which can be considered textile materials and are at least partly made of fibres. They can be made for example by weaving, by knitting, by the non-woven technique, or by connecting some structures made by the above-mentioned techniques. Textile materials also include artificial leathers and artificial furs. In addition to real leather, *i.e.* skin that is hairless on both sides, leather materials include furs. Products made of textile or leather materials include for example clothing, footwear, and interior textiles for homes or public facilities. An identification or control label can be attached to these materials either in the finished product or at a suitable stage of the manufacture.

Uses for identification labels include all semi-finished products and products made of textile or leather materials, particularly expensive products, such as so-called branded products. The identification labels are advantageous *e.g.* when there is a risk of parallel imports, *i.e.* imported products made to resemble the branded product. The identification labels can contain stored information on *e.g.* the manufacturer and the country of origin, wherein the origin of the product can be guaranteed. The identification labels can also be used by storing in them information that is variable upon the accumulation of the product life

cycle, for example information about the times of cleaning. Such information can be useful in working clothes intended to be washable, for example clean room clothes or working clothes that are used in connection with the manufacture of components sensitive to static electricity.

A control label triggers an alarm in alarm devices, such as gates at exits of retail outlets. If the control label has not been inactivated, an alarm will be given upon exiting through the gates, and possible shoplifting will be disclosed.

It is known that an identification or control means can be attached to a product for example by making a bag of a fabric and placing an identification or control means in the bag and attaching the bag to the product. A known method for attaching identification and control labels by means of an adhesive is the attachment with a conventional adhesive used on self-adhesive labels. However, the attachment of identification and control labels to a textile or leather material or a material similar to them involves problems. It is possible that the adhesive is shown as a spot on the other side of the material, particularly when the material has a coarse structure or the material is thin. For example, products made of silk are very susceptible to stains.

In many cases, the attached labels should also be fast to washing and other maintenance, such as ironing, steaming or pressing. The attachment of the labels must not come off or be wrinkled in such a way that *e.g.* disturbing bulges are formed on the surface of the product. Chemicals used in cleaning, whether wet or dry cleaning, are often very strong bases or strong solvents, wherein they can remove the label from its attachment. The identification or control label can also be destroyed by the effect of these agents, wherein the labels should be protected from destruction. In addition to cleaning, the identification or control label can be damaged during its manufacture or use.

The identification or control label according to the invention is characterized in that the adhesive layer of the identification or control label is cured by radiation. The method according to the invention is

characterized in that the identification or control label is attached with an adhesive cured by radiation.

It has been surprisingly found that identification or control labels can be attached to a textile material or leather with an adhesive cured by radiation in such a way that the disadvantages of prior art techniques can be avoided. The adhesive cured by radiation protects the smart label from damage caused by heat and moisture. The adhesive cured by radiation can be an adhesive cured by means of ultraviolet (UV) radiation or an adhesive cured by an electron beam (EB). The adhesive is cured before it is attached to a textile or leather material in such a way that a suitable adherence to each product is achieved. The required adherence varies according to the product.

The identification or control label can be manufactured either with or without hermetically protective films. Both applications have the same advantages which are based on the use of an adhesive cured by radiation when forming the adhesive layer. The identification or control labels can be attached to their target automatically with a high speed, wherein they are attached at their adhesive layer to the desired surface. The identification or control labels are easy and inexpensive to manufacture. The labels are fast to dry cleaning and they do not stain or release colour. In addition to the above-mentioned advantages, hermetically protected labels have the advantage to labels without protection that the hermetic protection secures better long-term performance in all uses.

On the reverse side of identification or control labels made with or without hermetically protective films, against the adhesive layer, there is a back film which can be made of paper or a plastic film. The surface of the back film is normally treated in such a way that the adhesive layer can be easily detached from it. The back film can be made of *e.g.* paper coated with silicon. The back film is released from the identification or control label before its attachment to the product.

Adhesives which are cured by radiation and are advantageous for forming the adhesive layer include adhesives which can be transfer laminated and cured by ultraviolet radiation. They can be for example

acryl copolymers developed for textile materials and containing a chemically integrated photoinitiator. These hot-melt adhesives do not contain solvents or water. They can be cross-linked by ultraviolet radiation as far as is important in view of the application. The quantity of the adhesive to be used varies from 20 to 50 g/m^2. It is specific to these adhesives that they are also resistant to solvents used in dry cleaning and do not stain the product.

The transfer lamination is performed by providing an adhesive layer which is applied on the back film and which, when pressed against one contact surface, such as one side of a smart label, adheres to it with a greater force that is effective between the back film and the adhesive layer. The back film can thus be detached from the adhesive layer, when the identification or control label is attached to the surface of a textile or leather material.

Normally, identification or control labels are manufactured by attaching the layers which form the identification or control labels in the form of a continuous web. After this, either directly or through intermediate steps, the identification or control labels are punched off.

In the following, the invention will be described with reference to the appended drawings, in which

Fig. 1 shows a smart label in a top view,

Figs. 2 to 4 show some embodiments of the invention in cross-sectional views,

Figs. 5 to 7 show an identification label according to the invention attached to a textile or leather material, and

Fig. 8 shows an embodiment of the invention in a cross-sectional view.

Figure 1 shows a smart label 1 in a top view, including a circuitry pattern 11 and an integrated circuit on a chip 2 therein. The smart label 1 can be manufactured by pressing the circuitry pattern on a film with an

electroconductive printing ink, by etching the circuitry pattern on a metal film, by punching the circuitry pattern off a metal film, or by winding the circuitry pattern of *e.g.* a copper wire. The circuitry pattern is provided with an identification circuit, such as a radio frequency identification (RFID) circuit. The identification circuit is a simple electric oscillating circuit (RCL circuit) tuned to operate at a defined frequency. The circuit consists of a coil, a capacitor and a circuit integrated on a chip, consisting of an escort memory and an RF part for communication with a reader device. The capacitor of the RCL circuit can also be integrated on the chip.

Information can also be stored on the identification label to be read later. The information to be stored can consist of permanent and variable data. The memory of the chip 2 in the identification label may consist of for example 516 bits, of which 64 bits are only readable (ROM) and the rest of the capacity can be both read and altered (RAM). The permanent data may contain for example the origin of the product or other corresponding permanent data, and the variable data may contain for example data about the times of cleaning or other corresponding data variable for the product.

Figure 2 shows one embodiment for the structure of a single identification label. The identification label comprises a smart label 1, an adhesive layer 3, and a back film 4. The smart label 1 is provided with a chip 2. The smart label 1 has that side, on which the chip 2 is attached, against the adhesive layer 3. The adhesive layer 3 is a hot-melt adhesive cured by ultraviolet radiation.

When the smart label 1 has that side, on which the chip 2 is attached, against the adhesive layer 3, the adhesive layer 3 protects the RFID circuit and the attached chip 2 on the smart label 1 from external effects, such as moisture. When the adhesive has been suitably radiated and the back film 4 is removed, the identification label can be attached to a textile or leather material by means of the adhesive layer 3.

Figure 3 shows one embodiment for the structure of a single identification label. The identification label comprises a smart label 1, a surface

film 5 protecting the chip 2 fixed to the smart label 1, an adhesive layer 3, and a back film 4.

In this embodiment, the smart label 1 is protected by the separate surface film 5 which is attached to the smart label 1 with an adhesive cured by radiation. The material of the cover film 5 is a film passing UV radiation, such as a polypropylene or polyethylene film. The other side of the surface film 5 is provided with an adhesive layer 3 cured by radiation, by means of which the identification label is attached to a textile or leather material.

Figure 4 shows one embodiment for the structure of a single identification label. The identification label comprises a surface film 5, a smart label 1, an adhesive layer 3, and a back film 4. The smart label 1 is provided with a chip 2.

In this embodiment, the surface film 5 is attached to the surface of the smart label 1 in such a way that the surface film 5 forms the outer surface of the identification label. The surface film 5 and that side of the smart label 1, on which the chip 2 is fixed, are in contact with each other. The surface film 5 can be a protective film for the smart label 1. The other side of the smart label 1 is provided with an adhesive layer 3, by means of which the identification label is attached to a textile or leather material.

Figures 5 to 7 show the attachment of the labels of Figs. 2 to 4 to a textile or leather material 6. The back film 4 is removed, and the adhesive layer 3 is brought into contact with the textile or leather material 6.The identification label is attached to the textile or leather material 6 by means of an adhesive layer 3 cured by radiation, such as ultraviolet radiation or an electron beam. The textile or leather material 6 can be for example a woven label which may have a trade mark, washing instructions, information about the country of origin, or other corresponding information on its front side. The identification label is attached to the reverse side of such a woven label. The woven label is attached at its edges by sewing or glueing to the product in such a way that the identification label remains invisible; in other words, the identification label can be for example between the woven label and the lining

of a coat. It is also possible that the identification label is suitably fixed between the top fabric and the lining already at the stage of manufacturing of the product. Preferably, the identification label is not accessible without breaking the product.

Figure 8 shows one embodiment of the invention, in which the identification label is formed in such a way that the smart label 1 is placed between a heat-sealable upper film 7 and a heat-sealable lower film 8. A laminate is formed of a back film 4, an adhesive layer 3 and the lower film 8, single smart labels 1 being dispensed at suitable spaces on the laminate. At this stage of the manufacture, the back film 4, the upper film 7 and the lower film 8 form a continuous web. Smart labels 1 can be provided both next to each other and one after another on the surface of the lower film 8.

The heat-sealable upper and lower films 7 and 8 are attached to each other in such a way that the films are sealed to each other outside the edge of the smart label 1 around the whole smart label, wherein the smart label 1 is hermetically sealed by a seam S between the heat-sealable films. The seam S is sufficiently wide so that the hermetic sealing is maintained when the labels are cut off. The seam S can also be formed by two parallel seams, between which the cutting off is performed. The labels can also be separated by cutting with a seam tool, wherein the label is heat sealed and punched, and excess material is removed in a single work step. As the smart label 1 is sealed between the films, it does not come in contact with ambient air, and with such a protection, the smart label 1 is provided with a long service life regardless of the chemical and/or mechanical stress it is subjected to. The heat-sealable films can be made of *e.g.* polypropylene or polyethylene.

In this embodiment, the chip 2 (not shown in the figure) can be placed either against the upper film 7 or against the lower film 8. The chip 2 can be coated with a protective surface film 5, or it can be without a surface film.

When the smart labels 1 are hermetically sealed by heat-sealing between the upper film 7 and the lower film 8, the laminate can be printed. After this, the identification labels are separated from each

other by cutting both in the longitudinal and transverse directions either into single identification labels or into suitable sets. It is also possible that a perforation is provided between the identification labels, whereby they can be easily detached from each other.

The above description does not restrict the invention, but the invention may vary within the scope of the claims. In addition to an identification label comprising a smart label, the above-presented structures can be applied in a control label comprising an alarm label. The main idea in the present invention is that the identification or alarm label can be attached to a textile or leather material in such a way that the risk of damaging the labels is small and the label can be attached to the surface in a simple and clean way without damaging the product.

Claims:

1. An identification or control label to be attached to a textile or leather material (6), comprising a smart or alarm label (1), an adhesive layer (3) and a back film (4) arranged to be released before the attachment to the textile or leather material, **characterized** in that the adhesive layer (3) of the identification or control label is cured by radiation.

2. The label according to claim 1, **characterized** in that the adhesive layer (3) is cured by means of ultraviolet (UV) radiation or an electron beam (EB).

3. The label according to claim 1 or 2, **characterized** in that it comprises a surface film (5) between the smart or alarm label (1) and the adhesive layer (3).

4. The label according to claim 1 or 2, **characterized** in that it comprises a surface film (5) on the surface of the smart or alarm label (1), on the side opposite to the adhesive layer (3).

5. The label according to claim 1 or 2, **characterized** in that it comprises heat-sealable films (7, 8) on both sides of the smart or alarm label (1), wherein an adhesive layer (3) is provided on the surface of the heat-seablable lower film (8), on the side opposite to the alarm label (1).

6. The label according to claim 5, **characterized** in that the heat-sealable films (7, 8) are heat-sealed together on the outer side of the edges of the smart or alarm label (1) in such a way that the smart or alarm label (1) is in a space closed by a hermetic seal.

7. A method for attaching an identification or control label to a textile or leather material (6), **characterized** in that the identification or control label is attached by radiation with a cured adhesive.

8. The method according to claim 77, **characterized** in that the identification or control label is attached to the textile or leather material (6)

with an adhesive cured by means of ultraviolet radiation or an electron beam.

9. The method according to claim 7 or 8, **characterized** in that the quantity of radiation is adjusted upon curing of the adhesive before the attachment in such a way that a suitable adherence to the textile or leather material (6) is achieved.

10. The use of an adhesive cured by radiation in an adhesive layer (3) of an identification or control label to be attached to a textile or leather material (6).

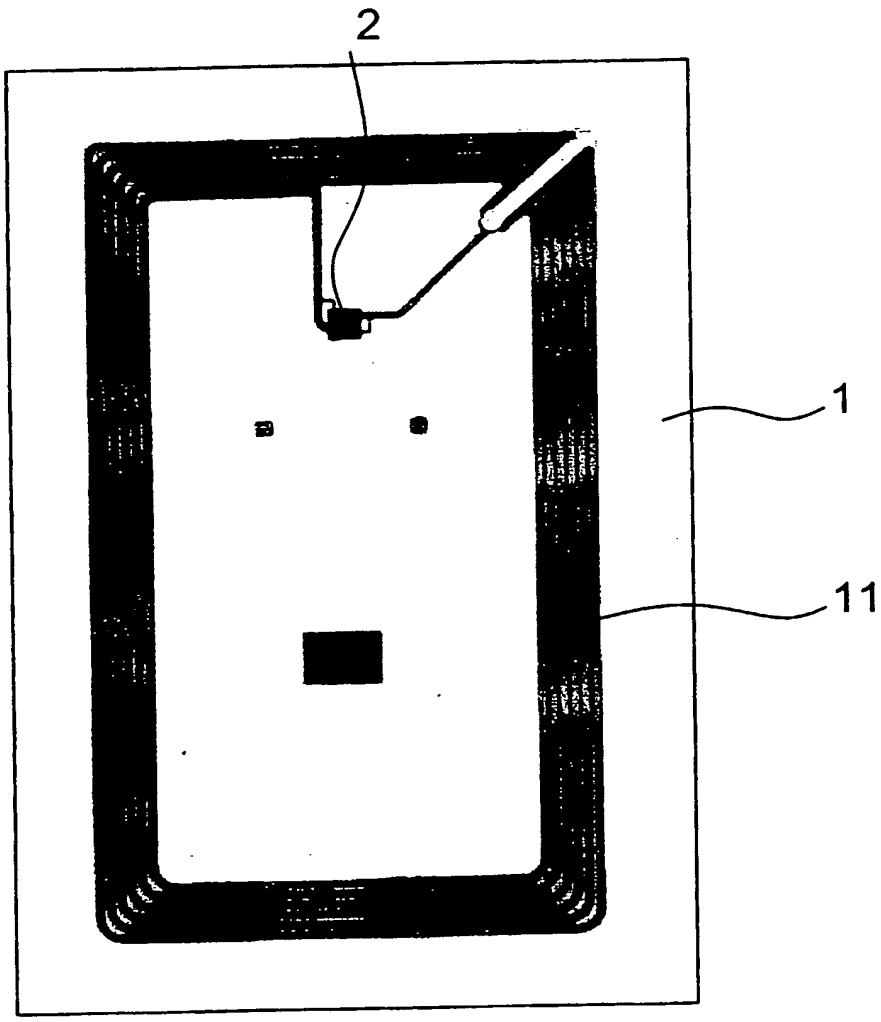

Fig. 1

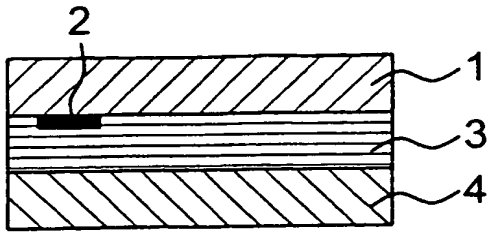

Fig. 2

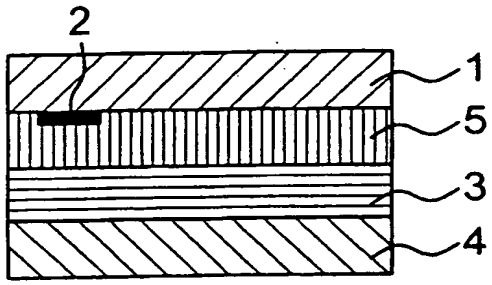

Fig. 3

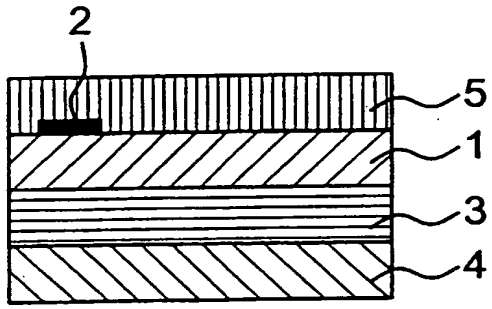

Fig. 4

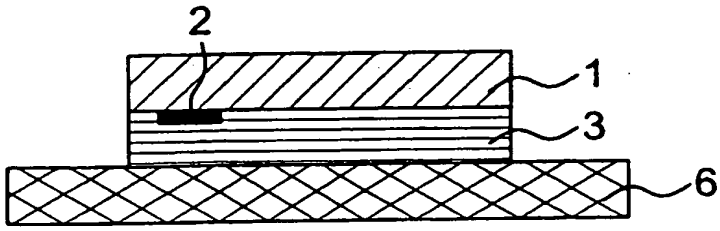

Fig. 5

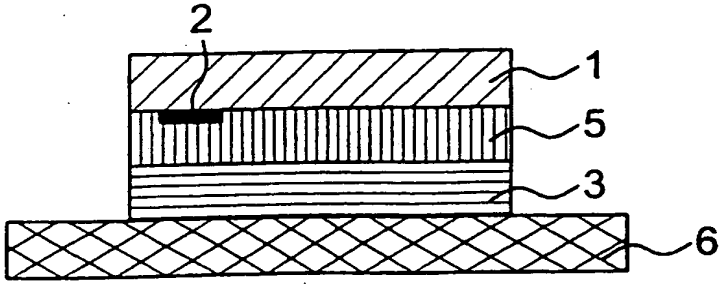

Fig. 6

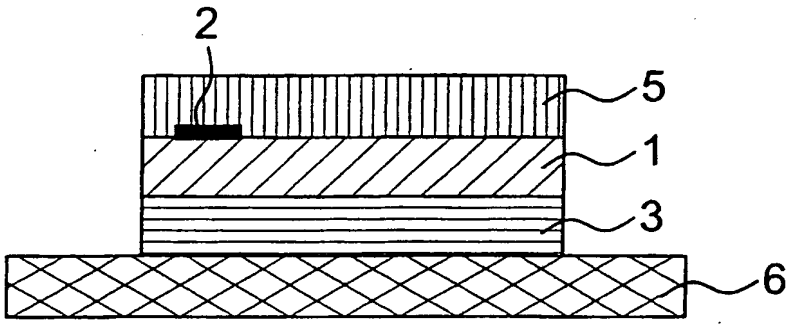

Fig. 7

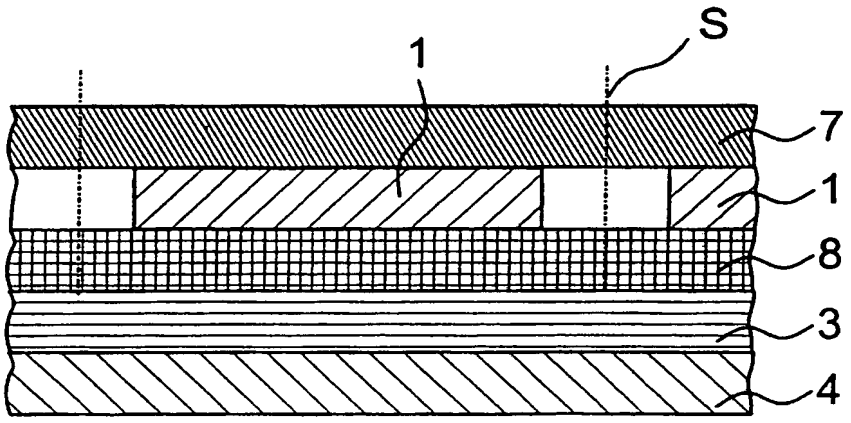

Fig. 8

INTERNATIONAL SEARCH REPORT

International application No.
PCT/FI 01/00259

A. CLASSIFICATION OF SUBJECT MATTER

IPC7: G09F 3/10, G08B 13/24
According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC7: G09F, G08B

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

SE,DK,FI,NO classes as above

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

EPO-INTERNAL, WPI DATA

C. DOCUMENTS CONSIDERED TO BE RELEVANT

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Y	EP 0845516 A2 (LINTEC CORPORATION), 3 June 1998 (03.06.98), page 4, line 35 - line 45 --	1-4,7-10
Y	WO 8808180 A1 (BLEYS, D. ET AL), 20 October 1988 (20.10.88) --	1-4,7-10
Y	EP 0579430 A1 (MOORE BUSINESS FORMS, IND.), 19 January 1994 (19.01.94) --	1-4,7-10

[X] Further documents are listed in the continuation of Box C. [X] See patent family annex.

* Special categories of cited documents:
"A" document defining the general state of the art which is not considered to be of particular relevance
"E" earlier application or patent but published on or after the international filing date
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"X" document of particular relevance: the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
"Y" document of particular relevance: the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
15 June 2001	19 -06- 2001
Name and mailing address of the ISA/ Swedish Patent Office Box 5055, S-102 42 STOCKHOLM Facsimile No. +46 8 666 02 86	Authorized officer Helena Rennermalm / MRo Telephone No. +46 8 782 25 00

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INTERNATIONAL SEARCH REPORT

International application No.
PCT/FI 01/00259

C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

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INTERNATIONAL SEARCH REPORT

Information on patent family members

28/05/01

International application No.
PCT/FI 01/00259

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